



The angle  $\alpha$  is  $30^\circ$  in the example ( $\pi/6$  in radians). The sine of  $\alpha$ , which is the height of the red line, is

$$\sin \alpha = 1/2.$$

By the Theorem of Pythagoras we have  $\cos^2 \alpha + \sin^2 \alpha = 1$ . Thus the length of the blue line, which is the cosine of  $\alpha$ , must be:

$$\cos \alpha = \sqrt{1 - 1/4} = \frac{1}{2}\sqrt{3}.$$

This shows that  $\tan \alpha$ , which is the height of the orange line, is:

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{1}{\sqrt{3}}$$